

$V_{RRM}$  = 1200 V  
 $I_F (T_C=155^\circ\text{C})$  = 10 A  
 $Q_C$  = 52 nC

### Features

- Extremely low reverse current
- No reverse recovery current
- Temperature independent switching
- Positive temperature coefficient on  $V_F$
- Excellent surge current capability
- Low capacitive charge

### Benefits

- Essentially no switching losses
- System efficiency improvement over Si diodes
- Increased power density
- Enabling higher switching frequency
- Reduction of heat sink requirements
- System cost savings due to smaller magnetics
- Reduced EMI

### Applications

- Switch mode power supplies (SMPS)
- Uninterruptible power supplies
- Motor drivers
- Power factor correction

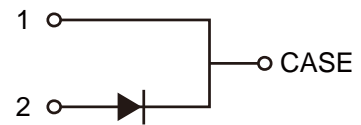
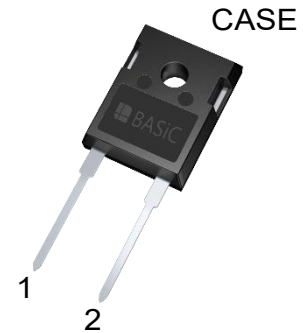
### Package Pin Definitions

- Pin1- Cathode
- Pin2- Anode

### Package Parameters

| Part Number | Marking   | Package  |
|-------------|-----------|----------|
| B1D10120H   | B1D10120H | TO-247-2 |

TO-247-2



**Maximum Ratings ( $T_c=25^\circ\text{C}$  unless otherwise specified)**

| Symbol        | Parameter                            | Test conditions   | Value     | Unit                 |
|---------------|--------------------------------------|---|-----------|----------------------|
| $V_{RRM}$     | Repetitive peak reverse voltage      |   | 1200      | V                    |
| $V_{RSM}$     | Non-repetitive peak reverse voltage  |   | 1200      | V                    |
| $I_F$         | Continuous forward current           | $T_c=25^\circ\text{C}$<br>$T_c=155^\circ\text{C}$           | 37<br>10  | A                    |
| $I_{FSM}$     | Non-Repetitive forward surge current | $T_c=25^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Wave | 75        | A                    |
| $\int i^2 dt$ | $i^2t$ value                         | $T_c=25^\circ\text{C}$ , $t_p=10\text{ms}$                  | 28.12     | $\text{A}^2\text{S}$ |
| $P_{tot}$     | Power dissipation                    | $T_c=25^\circ\text{C}$<br>$T_c=110^\circ\text{C}$           | 202<br>87 | W                    |
| $T_j$         | Operating junction temperature       |   | -55~175   | $^\circ\text{C}$     |
| $T_{stg}$     | Storage temperature                  |   | -55~135   | $^\circ\text{C}$     |
|               | TO-247 mounting torque               | M3 Screw  | 0.7       | Nm                   |

**Thermal Characteristics**

| Symbol       | Parameter                                | Value |      |      | Unit |
|--------------|--|-------|------|------|------|
|              |  | Min.  | Typ. | Max. |      |
| $R_{th(jc)}$ | Thermal resistance from junction to case |       | 0.74 |      | K/W  |

**Electrical Characteristics**
**Static Characteristics**

| Symbol   | Parameter             | Test conditions   | Value |             |      | Unit    |
|----------|-----------------------|---|-------|-------------|------|---------|
|          |                       |   | Min.  | Typ.        | Max. |         |
| $V_{DC}$ | DC blocking voltage   | $T_j=25^{\circ}C$   | 1200  |             |      | V       |
| $V_F$    | Diode forward voltage | $I_F=10A$ $T_j=25^{\circ}C$<br>$I_F=10A$ $T_j=175^{\circ}C$     |       | 1.48<br>1.9 |      | V       |
| $I_R$    | Reverse current       | $V_R=1200V$ $T_j=25^{\circ}C$<br>$V_R=1200V$ $T_j=175^{\circ}C$ |       | 10<br>20    |      | $\mu A$ |

**AC Characteristics**

| Symbol | Parameter                 | Test conditions   | Value |                 |      | Unit    |
|--------|---------------------------|---|-------|-----------------|------|---------|
|        |                           |   | Min.  | Typ.            | Max. |         |
| $Q_C$  | Total capacitive charge   | $V_R=800V$ $T_j=25^{\circ}C$<br>$Q_c = \int_0^{V_R} C(V)dV$     |       | 52              |      | nC      |
| $C$    | Total capacitance         | $V_R=1V$ $f=1MHz$<br>$V_R=400V$ $f=1MHz$<br>$V_R=800V$ $f=1MHz$ |       | 591<br>49<br>36 |      | pF      |
| $E_C$  | Capacitance stored energy | $V_R=800V$  |       | 14              |      | $\mu J$ |

Typical Performance

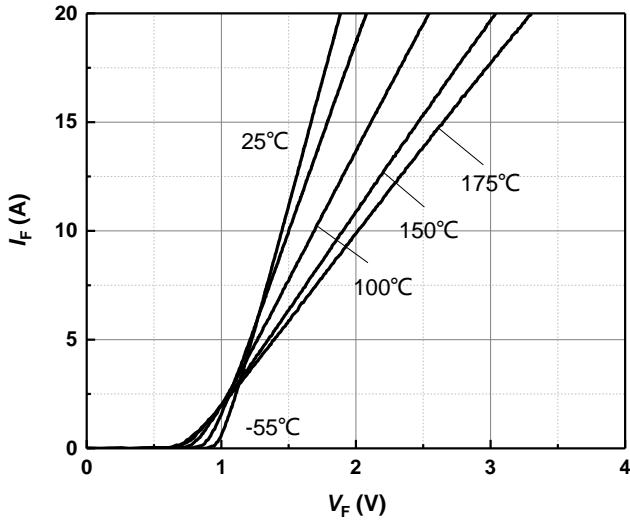


Figure 1. Typical forward characteristics

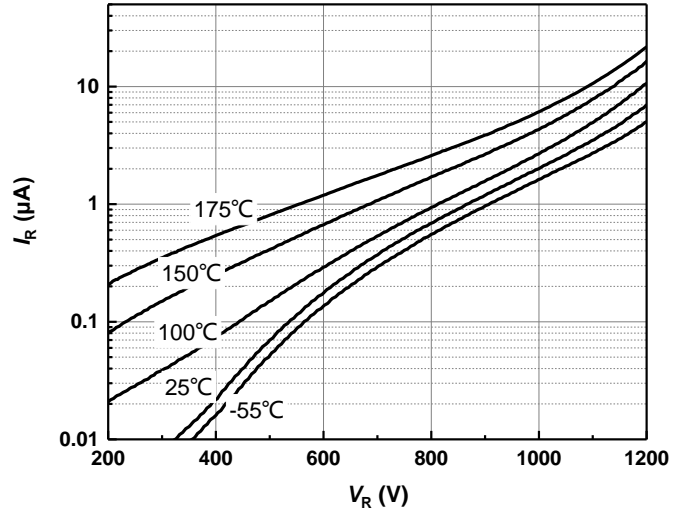


Figure 2. Typical reverse current as function of reverse voltage

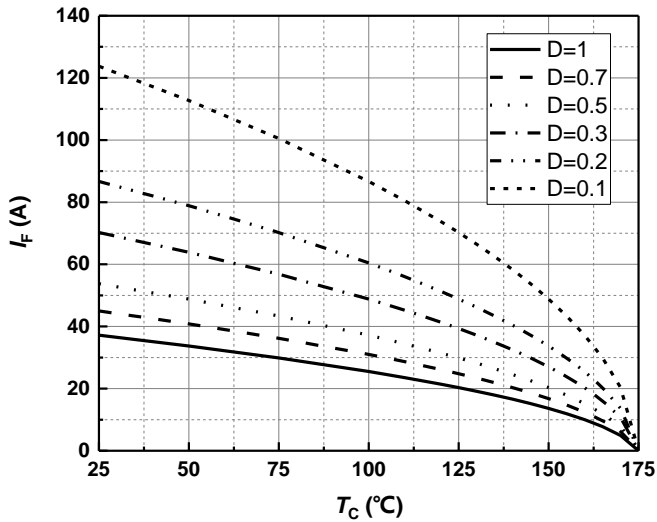


Figure 3. Diode forward current as function of temperature, D=duty cycle

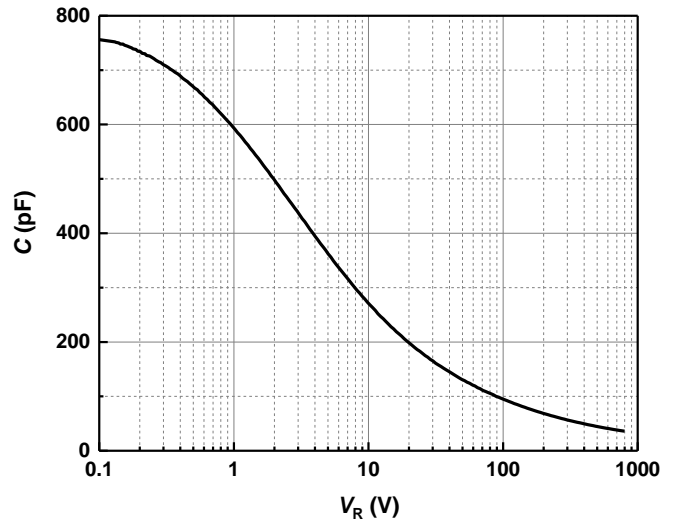


Figure 4. Typical capacitance as function of reverse voltage,  $C=f(V_R)$ ;  $T_J=25^{\circ}$ C;  $f=1$  MHz

Typical Performance

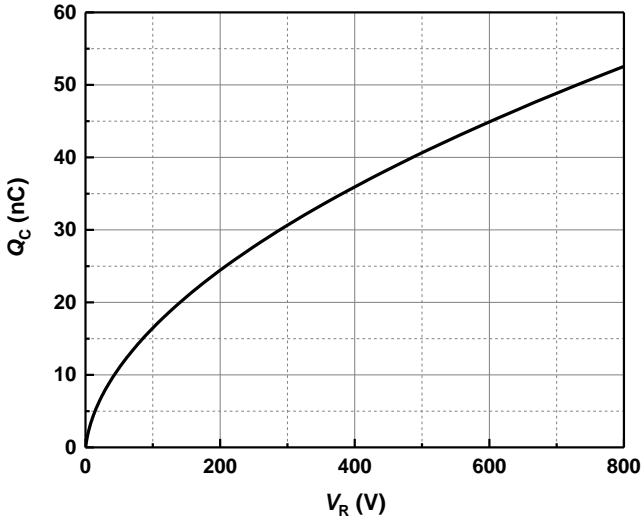


Figure 5. Typical reverse charge as function of reverse voltage

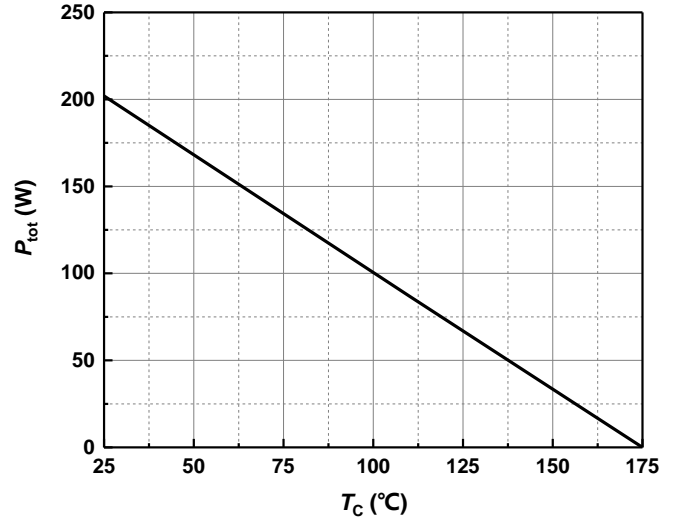


Figure 6. Power dissipation as function of case temperature

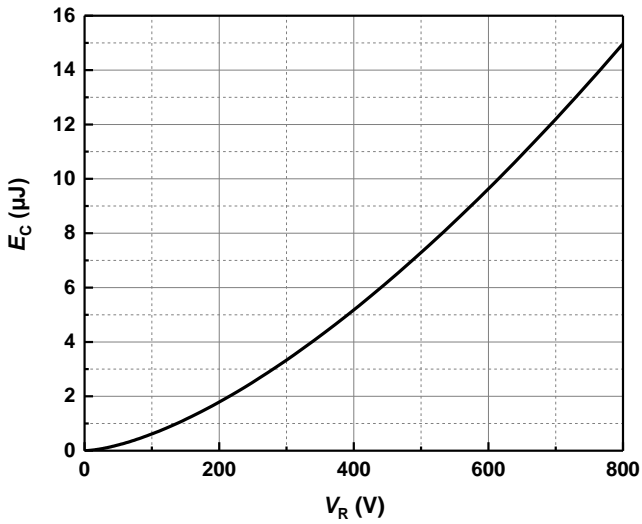


Figure 7. Capacitance stored energy

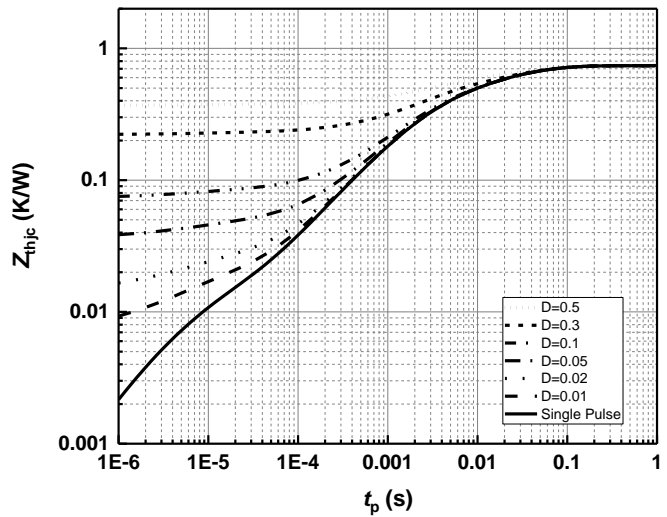
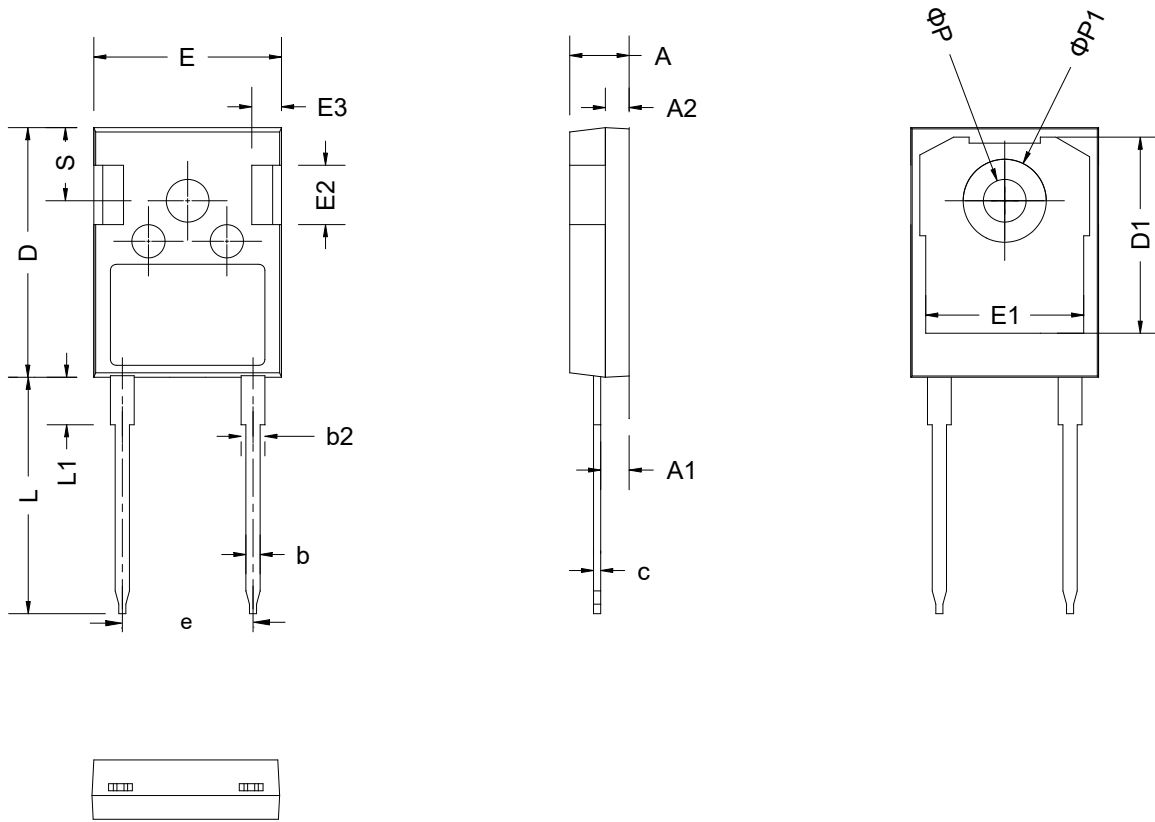


Figure 8. Max. transient thermal impedance,  $Z_{thjc} = f(t)$ , parameter:  $D = t/T$

**Package Dimensions**


| SYMBOL | mm        |       |       |
|--------|-----------|-------|-------|
|        | MIN       | NOM   | MAX   |
| A      | 4.80      | 5.00  | 5.20  |
| A1     | 2.21      | 2.41  | 2.61  |
| A2     | 1.85      | 2.00  | 2.15  |
| b      | 1.11      | 1.21  | 1.36  |
| b2     | 1.91      | 2.01  | 2.21  |
| c      | 0.51      | 0.61  | 0.75  |
| D      | 20.70     | 21.00 | 21.30 |
| D1     | 16.25     | 16.55 | 16.85 |
| E      | 15.50     | 15.80 | 16.10 |
| E1     | 13.00     | 13.30 | 13.60 |
| E2     | 4.80      | 5.00  | 5.20  |
| E3     | 2.30      | 2.50  | 2.70  |
| e      | 10.88 BSC |       |       |
| L      | 19.62     | 19.92 | 20.22 |
| L1     | -         | -     | 4.30  |
| φ P    | 3.40      | 3.60  | 3.80  |
| φ P1   | -         | -     | 7.30  |
| S      | 6.15 BSC  |       |       |

**Revision History**

| <b>Document Version</b> | <b>Date of Release</b> | <b>Description of Changes</b> |
|-------------------------|------------------------|-------------------------------|
| Rev. 1.0                | 2020-07-06             | Release of the datasheet.     |
|                         |                        |                               |
|                         |                        |                               |
|                         |                        |                               |

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